1,190,176

PATENT SPECIFICATION

DRAWINGS ATTACHED

1,190,176

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COMPLETE SPECIFICATION

Improvements in and relating to Ring-Mechanisms for Loose-Leaf Binders and the like

We, ROBERT KRAUSE KG, German company, of 4992 Espelkamp, Postfach 125, Western Germany, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to ring-mechanisms for loose-leaf binders and the like.

In one known form, a ring mechanism is provided with divided rings, of which the halves are respectively mounted on two supporting bars located side-by-side in edge-to-edge lengthwise contact, the outer edges of the bars being held rockerlike in corresponding flanged edges of a spring cover bar, a ring or bow-shaped part passing through the cover bar at a pre-determined point and being connected to its associated support bar.

In the case of known ring mechanisms of this type, provided for incorporation in ring books, the width of the support bars is equal, so that the arc of ring pivoting during the opening movement is likewise equal on both sides. The cover bar which covers the support bar is slightly convex and, in its shape and construction, allows only a little space between support bars and cover bar. To facilitate mounting a ring or bow member may project through the free space beneath the support bar.

It has been found advantageous for the retaining bow to perform only a small pivoting movement during opening of the mechanism, so that the contents suffer the minimum displacement; consequently, the resistance of the contents to the opening function is lessened and the mechanism is more easily opened and closed. Also when a side piece of the retaining bar passes under the edge of the cover spring, mounting on the under side of the support bar proves to be favourable from the point of view of manufacture and operation. Furthermore, the prior construction of cover bar does not help to keep large-hole-perforated sheets of contents in a book format in the substantially smaller cross-section of the ring or bow parts. It favours the unwanted displacement and loosening particularly of the bottom batch of sheets, so that these sheets no longer remain in the desired booklike position. To meet this requirement is however important where mechanisms of this type are concerned.

It is an object of the present invention to provide a ring-mechanism which will be free of disadvantages of known types when meeting the aforesaid requirements, and with this end in view the invention consists in a ring-mechanism for loose-leaf binders and the like, the ring mechanism comprising upstanding rockable bows or half-loops which at their lower ends are connected to, or formed with, members housed, in edge-to-edge or tip-to-tip contact in a tunnel-like spring, in order to form spring-toggle means controlling the opening and closing of the loops, wherein the toggle components are formed and dimensioned to ensure that in rocking between closed and fully open positions, cooperating bows or half-loops have substantially different angular movements.

The members to which the bows or half-loops are connected are preferably support bars of different widths. The bow or half-loop on which loose leaves are normally mounted will be referred to as the "retaining bow" and the other as the "clamping bow." Preferably the support bar of the clamping bow is narrower than that of the retaining bow so that during the opening movement the narrower bar, and hence the clamping bow pivoting therewith, describes an arc which is almost twice as great as that described by the retaining bow on the broader bar. In conformity with the use of bars of different widths for asymmetric mounting of the half-loops, the cover spring may also be of asymmetric shape, e.g. of ridged shape, having a slight upward incline from the side of the clamping bow

across about two-thirds of the width of the cover spring, with a smaller side declining more steeply, almost at right-angles to the wider side (where it may be substantially parallel to an oblique portion of the retaining bow). In this configuration, the support bar leaves so much space inside the cover spring that it is possible for the retaining bow to extend across the top of the support bar for attachment.

At the same time, the more steeply, downwardly inclined side which is substantially parallel with the oblique portion of the retaining bow, offers a support and a fulcrum for leaves with a large-diameter perforation.

In a modified form of the invention the support bars may each be replaced by a length of rod or wire extending between, and integral with, a half-loop or bow at each end, the intervening lengths of rod or wire being formed with radially-extending fingers, (e.g. bent to V-shape) which cooperate togglewise with other fingers on the rod of the cooperating half-loop assembly, to function in a manner closely similar to the support bars.

Embodiments of the invention described by way of example hereinafter, are illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of a mechanism according to the invention, having a portion removed for illustrative purposes:

Figure 2 is a cross-section along the line A-B through a closed ring mechanism according to Figure 1:

Figure 3 is a cross-section according to Figure 2 but with the ring mechanism open.

Figure 4 shows a perspective view of another ring mechanism according to the invention, with a portion removed for illustrative purposes:

Figure 5 is a cross-section along the line C-D through the closed ring mechanism: and

Figure 6 is a cross-section according to Figure 5 but with the mechanism open.

The ring mechanism shown in Figures 1—3 consists of retaining bows or half-loops 1 on which perforated leaves are normally mounted, pivoting clamping bows or half-loops 2, and a tunnel-like cover spring 3, which serves as a cover for support bars 4 and 5. Each clamping bow 2 is of substantially semi-circular shape, formed at its mounting end with a projection substantially perpendicular to the support bar 4, to which it is irremovably connected.

The projecting part of each clamping bow 2 protudes through an aperture in the spring 3. Each retaining bow 1 has a base limb 6 and an upstanding limb 11 at an acute angle of approximately 60° thereto. At its top the limb 11 is bent to meet and abut on the end of a cooperating clamping bow 2 of substantially semi-circular shape. The lower member 6 extends substantially horizontally (and parallel with the cover of a book to which the ring mechanism is attached) as far as a recess provided in the edge of the cover spring 3 which is angled (Figure 3). A cut-out 7 in the support bar 5 allows the bar, here sharply-bent, to turn up through it and to bear on the top face of the support bar 5. After being bent once more down into an aperture 8 in the support bar, the end of the bar is secured on the underside of the support bar 5. The spring 3 is asymmetrically ridged (Figure 2 and 3) in cross-section, so that, at the side 9, supporting the clamping bow 2, there is a comparatively slight upward inclination, extending over about two-thirds of the width of the spring, while the other side 10 is narrower and declines steeply, almost at right-angles to the side 9, being substantially parallel to the oblique portion 11 of the retaining bow 1. The hollow space 12 so produced between the walls 9 and 10 inside the tunnel-like spring 3 accommodates the bent end of the retaining bow 1 resting on the support bar 5, and ensures a perfect rockerlike movement.

The opening of the ring mechanism to a greater extent on one side than on the other, which is mainly required in practice, is achieved in the form of the invention now being described by the support bars 4 and 5 being of different widths. Whereas the support bar 5 connected to the retaining bow 1 rocks through an angle of approximately 20° during the opening and closing movement, the narrower support bar 4 connected to the clamping bow 2 described an angle of approximately 40°. The same relationship can be seen at the joint abutment of the two bows 1 and 2 (Figure 3). The distance travelled by the joint abutment of the retaining bow 1 is only about one-quarter to one-third of that which is traversed by the clamping bow. The side 10 of the spring 3 which extends substantially parallel to the obliquely positioned portion 11 of the retaining bow 1 serves at the same time as a guide and support for the bottom part of the contents, particularly in the case of sheets having large-diameter perforations.

In another form of ring mechanism according to the invention shown in Figures 4—6 are two dissimilar bow parts, each bent from a single piece of wire, having cooperating parts of different lengths, and an asymmetrical ridged spring serving as a cover. A pivoting pair of bows 21 bent into semi-circular shape, are joined together by an integral length of wire bent near each bow 21 to form a projecting V-shaped finger, or loop 22.

The pair of retaining bows 23 each at an acute-angle of approximately 60° in relation to its base are joined by an integral length of wire bent to form a radially projecting V-shaped limb or loop 24. The limb or loop 24 is substantially longer than the finger 2. As they approach the abutment point, the top ends 25 of the bows 21, 23 are shaped e.g. of semi-circular form, each to cooperate with the opposite bow. Whereas the clamping bows

21 project through apertures in the top of the cover spring 26, the retaining bows 23, in the embodiment illustrated, are passed through the lower edge of the cover spring. Inside the cover spring, the loops 22, 24 have tip-to-tip toggle contact at 27. The shape of the cover spring 26 is substantially as described above with reference to Figures 1—3. A slight rise 28 originating from the side of the clamping bow 21 extends across almost two-thirds of the width. In relation to this rise 28, the other side 29 is narrower and falls away almost at right-angles to the side 28, lying substantially parallel to the oblique portions 30 of the pair of retaining bows 23. The longitudinal wire portions of the loop components are mounted in known manner in bottom-angled portions of the cover spring 26.

The cooperating toggle loops 22, 24 of different radial lengths move through different angles in their rocking movement to open or close the loops. The necessary consequence of this is that different distances are travelled by the clamping and retaining bows from or to the joint abutments, when the file is opened or closed. The longer loop 24 described a smaller angle, so that the associated retaining bows travel only a short distance during opening, while the larger angle of movement of loops 22 results in the tips of the clamping bows travelling almost twice the distance during opening.

The parallel position of the cover side 29 in relation to the portions 30 of the retaining bows provides the support and guiding function of the cover spring in respect of inserted leaves, particularly when these latter are perforated with large-diameter holes.

WHAT WE CLAIM IS:—

1. A ring-mechanism for loose-leaf binders and the like, the ring mechanism comprising upstanding rockable bows or half-loops which at their lower ends are connected to, or formed with, members housed, in edge-to-edge or tip-to-tip contact in a tunnel-like spring, in order to form a spring-toggle means controlling the opening and closing of the loops, wherein the toggle components are formed and dimensioned to ensure that in rocking between closed and fully open positions, cooperating bows or half-loops have substantially different angular movements.

2. A ring-mechanism as claimed in Claim 1 wherein a retaining bow or half-loop on which perforated leaves are normally mounted has comparatively small angular movement, and a cooperating, clamping-bow or half-loop, has a substantially greater angular movement between fully-open and closed positions.

3. A ring-mechanism as claimed in Claim 1 or 2 wherein the cooperating toggle limbs of two companion bows or half-loops are of substantially different dimension measured in each case from its fulcrum to the tip or edge abutting on the tip or edge of the other limb.

4. A ring-mechanism for loose leaf binders and the like, with divided rings on two lengthwise abutting support bars having outer long sides braced rockerlike in corresponding flanged edges of a tunnel-like spring, and a half-loop or bow-shaped part connected to each support bar, wherein clamping and retaining bows are disposed on the support bars which are of different widths, and are housed in the spring which is of asymmetrical ridged-shape and serves as a cover, and traverse different distances during opening, and closing of the mechanism.

5. A ring-mechanism as claimed in Claim 4 wherein the support bar connected to the retaining bow is wider than the support bar connected to the clamping bow.

6. A ring-mechanism as claimed in Claim 4 or 5 wherein the opening movement of the clamping bow is in the ratio of at least 2:1 in respect of that of the retaining bow.

7. A ring-mechanism as claimed in Claim 4, 5 or 6 wherein the spring serving as a cover is of such shape that over substantially two-thirds of its width its upper surface rises from the side of the clamping bow, while the remaining one-third of its width falls away substantially at right-angles to the wider portion and extends substantially parallel to an oblique portion of the retaining bow.

8. A ring-mechanism as claimed in any preceding claim, wherein a horizontal portion of an acutely-angled retaining bow, extending through the spring, is angularly-bent so that, for attachment purposes, it projects through, and to the upper face of, a support bar.

9. A ring-mechanism as claimed in Claim 1, 2 or 3 wherein a half-loop assembly comprises an integral length of wire or rod bent to form two half-loops held in spaced relationship by an intervening length of wire or rod from which project in a substantially radial direction one or more limbs constituting toggle members.

10. A ring-mechanism as claimed in Claim 9 comprising two of said half-loop assemblies in cooperative relationship with the (or each) toggle member of one assembly in tip-to-tip contact with the (or the corresponding) toggle member of the other assembly.

11. A ring-mechanism as claimed in Claim 10 wherein the (or each) toggle limb of one assembly is substantially longer than the (or the corresponding) toggle limb of the other assembly with which it is in contact.

12. A ring-mechanism for loose-leaf binders and the like, consisting of divided rings with pairwise-connected half-loops or bows each bent from a single piece of wire, said pairs of half-loops or bows cooperating to form a pair of rings or bows, and a spring which serves as a cover to accommodate the two bent-wire components, each of said components having a loop extending through or under the edge of the spring, and inwardly

therefrom, to make tip-to-tip contact with one another, and being of different lengths, so that, during opening of the ring-mechanism the distances travelled by the associated loops or bows are different, in accordance with the different lengths of the loops.

13. A ring-mechanism as claimed in Claim 12 comprising a retaining bow and a clamping bow wherein the length of loop associated with the retaining bow is greater than the length of the co-operating loop associated with the clamping bow.

14. A ring-mechanism as claimed in Claim 12 or 13 wherein the distance travelled by the clamping bow during opening is greater than the distance travelled by the retaining bow.

15. A ring-mechanism as claimed in Claim 12, 13 or 14 wherein the spring is of asymmetrical ridged channel shape, so that a slightly rising surface on the side of the clamping bow extends over approximately two-thirds of the width of the spring, the narrow surface falling away almost at right-angles in relation thereto, and extending parallel with an oblique portion of the retaining bow.

16. A ring-mechanism for a loose-leaf binder or the like, substantially as described herein with reference to Figures 1—3 or to Figures 4—6 of the accompanying drawings.

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1190176 COMPLETE SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 1

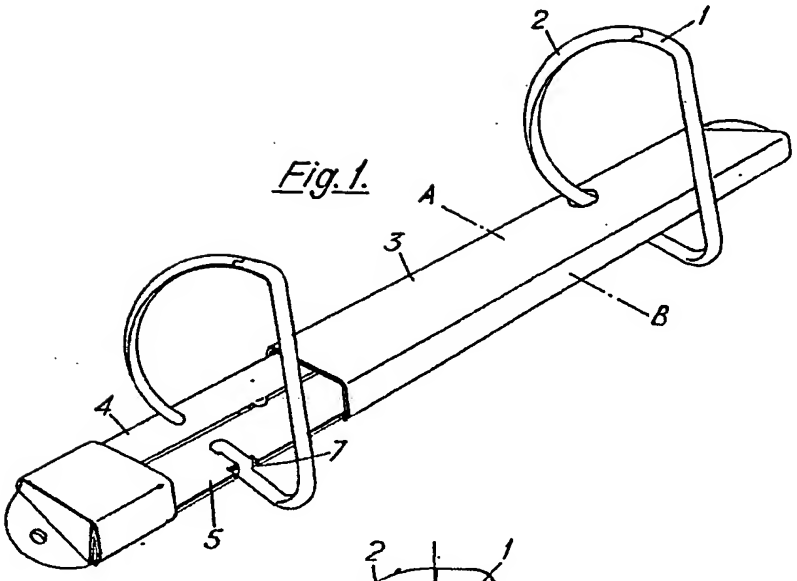

Fig. 1.

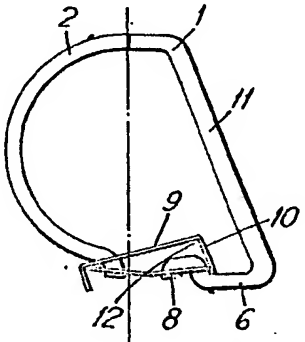

Fig. 2.

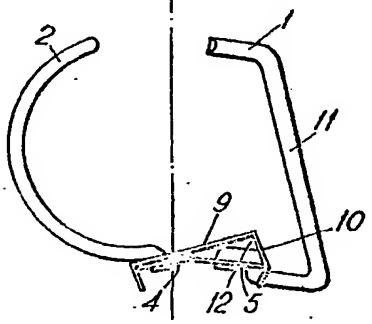

Fig. 3.

1190176 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 2

Fig. 4.

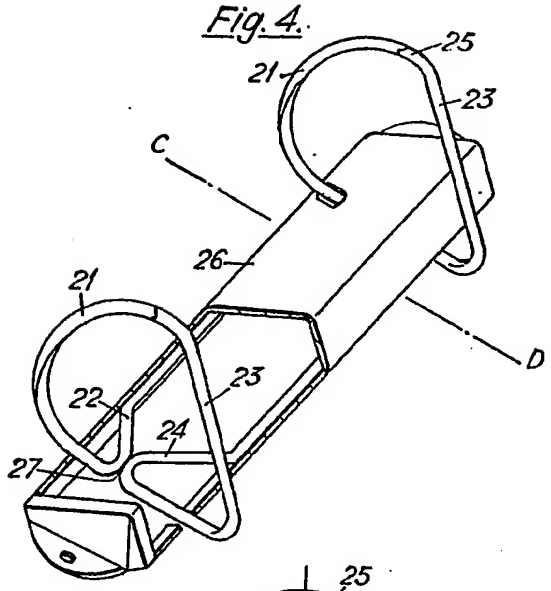

Fig. 5.

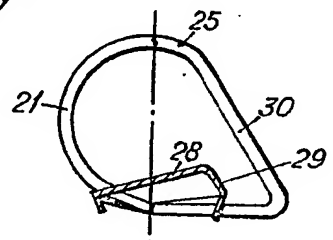

Fig. 6.